

REMARKS/ARGUMENTS

Reconsideration and allowance in view of the foregoing amendment and the following remarks are respectfully requested.

Claims 1-3, 7-10 and 12-35 are now pending.

The Examiner objected to the title of the invention as not being descriptive. The title has been revised in a manner as suggested by the Examiner. Reconsideration and withdrawal of the objection to the title is requested.

Claims 4-6 were withdrawn from further consideration as directed to a non-elected invention. It is noted that claim 11, dependent upon claim 4 was also directed to the non-elected injector. Non-elected claims 4-6 and 11 have been canceled above, without prejudice. Applicant reserves the right to file a divisional application directed to the subject matter of the non-elected invention.

Claim 21 was objected to because of a noted informality. Claim 21 has been revised above to address the matter noted by the Examiner. Withdrawal of the objection is solicited.

Claims 7-11 and 13-20 were rejected under 35 USC 112, second paragraph, as being indefinite. In this regard, the Examiner advised that it was unclear how limitations directed to particulars of the injector "effect the metes and bounds of apparatus (welding machine) claims". Claims 7-11 and 13-20 have been revised above to more specifically characterize the welding machine as constructed and arranged to join two cylinder members and to specify that the components of the injector include parts that the welding machine is adapted to join as the first and second cylinder members. It is respectfully submitted that these claims do properly further limit the claims from which they depend inasmuch as they require the welding machine to be constructed and arranged/adapted to join the specific cylinder members recited therein.

In this connection, Applicant is not attempting to use functional language in lieu of structure. Applicant is merely employing functional language to further limit the recited structure.

It is well settled that there is nothing intrinsically wrong with the use of functional language in a claim. In re Ludtke, 169 U.S.P.Q. 563 (C.C.P.A. 1971); In re Swinehart, 169 U.S.P.Q. 226 (C.C.P.A. 1971).

The C.C.P.A. addressed the issue of functional language limiting the claimed structure. In re Venezia, 189 U.S. P.Q. 149 (C.C.P.A. 1976), in addressing a Section 112 rejection, the C.C.P.A. stated that the claimed invention included structural limitations on each part and those structural limitations were defined by how the parts are to be interconnected in the final assembly. Id. at 151. The court stated that the terms "adapted to be affixed" or "when said housing is in its repositioned location", for example, define present structures or attributes of the parts identified, which limit that structure. The court further stated that there is nothing wrong in defining structures of the components of the completed assembly in terms of the interrelationship of the components, or the attributes they must possess. Id. at 152.

The C.A.F.C. in Pac-Tec Inc. v. Amerace Corp., 14 U.S.P.Q. 2d 1871 (Fed. Cir. 1990) affirmed a district court's finding of validity. The district court found that, when considering the claims as wholes, functional language such as "adapted to" and "thereby", for example, constitute structural limitations, citing In re Venezia, and that functional language cannot be disregarded in such cases. Pac-Tec Inc. v. Amerace Corp., at 1876.

For all the reasons advanced above, reconsideration and withdrawal of the rejection under 35 USC 112, second paragraph, is solicited.

Claim 1 as rejected under 35 USC 102(b) as being anticipated by Fujita et al (JP 54-33187).

The invention as set forth in the amended claims presented hereinabove is embodied in a welding machine, and a welding method, the welding method having particular advantage in connection with the manufacture of an injector. In this respect, the present invention enables precision welding by minimizing deformation of the welded object. The present invention is a preferred method for manufacturing a precision apparatus such as a fuel injector because the components of a fuel injector include easily deformable, thin metal cylinders which require precision shaping and dimensioning to achieve precision metering performance and fuel sealing performance.

The cited Fujita publication discloses a welding machine and a method of welding which employs two electron-guns or laser-guns located perpendicular to a work piece. See in this regard Figs.s5-8. However, Fujita's disclosure is more specifically directed to a welding machine and a method of welding wherein an electron beam or laser passes through the target object to weld both radial sides of a cylindrical target object, as is illustrated in Figs. 5-8. Additionally, Fujita specifically characterizes his machine and method as adapted to carry out welding without rotating the welding apparatus, as is understood from the two abstracts provided.

Anticipation under Section 102 of the Patent Act requires that a prior art reference disclose every claim element of the claimed invention. See, e.g., Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1574 (Fed. Cir. 1986). While other references may be used to interpret an allegedly anticipating reference, anticipation must be found in a single reference. See, e.g., Studiengesellschaft Kohle, G.m.b.H. v. Dart Indus., Inc., 726 F.2d 724, 726-27 (Fed. Cir. 1984). The absence of any element of the claim from the cited reference negates anticipation. See, e.g., Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 715 (Fed. Cir. 1984). Anticipation is not shown even if the differences between the claims and the prior art reference are insubstantial and the missing elements could be supplied by the knowledge of one skilled in the art. See, e.g., Structural Rubber Prods., 749 F.2d at 716-17.

In contrast to the teachings of Fujita, amended claim 1 presented hereinabove specifically limits the invention as recited therein to having a rotating action and a circumferential welding path provided by the rotating action. It is therefore respectfully submitted that claim 1 is not anticipated by Fujita.

Claims 1, 2, 3 and 12 were rejected under 35 USC 102(b) as being anticipated by Merrick et al. Applicant respectfully traverses this rejection.

Merrick discloses a welding machine and a method of welding, which employs two right-angled TIG torches. The two right-angled TIG torches rotate 90+ degrees relative to the welding object. Therefore, Merrick employs two sets of the two right-angled TIG torches in order to achieve a full circular welding path. See Fig. 3A. The torches do not, however, perform welding action twice on the same welding path.

Amended claims 1, 2, 3 and 12 specifically limit the claimed invention to a machine having a rotating action including at least one revolution and a welding path that is traced twice by the welding energy. It is therefore respectfully submitted that 1, 2, 3 and 12 as presented hereinabove are not anticipated by nor obvious from the disclosure and teachings of Merrick.

Claims 2, 3 and 12 were rejected under 35 USC 102(b) as being anticipated by Jegousse et al (UK'990).

Jegousse discloses a welding machine and a method of welding employing a plurality of electron-guns surrounding a welding object. According to the disclosure of Jegousse, the plurality of electron-guns are slightly moved in a sliding or swing action. Therefore, most of a welding path is not traced twice by the electron-guns.

In view of the foregoing, it is respectfully submitted that there are clear limitations in the claims as amended hereinabove that are not anticipated by nor obvious from Jegousse.

Claims 7-10 were rejected under 35 USC 103(a) as being unpatentable over Fujita and Urushizaki. Applicant respectfully traverses this rejection.

As noted above, Fujita fails to teach or suggest a welding machine and method of welding employing at least one revolution of relative rotation between energy applying guns and cylinder members to perform welding along a circumferential welding path. Urushizaki discloses a welding machine and a method of welding a fuel injector. However, Urushizaki fails to overcome the deficiencies of Fujita noted above since Urushizaki also fails to teach or suggest the relative rotating action through more than one revolution.

It is therefore respectfully submitted that even if one skilled in the art attempted to combine Fujita and Urushizaki, the result would not teach or suggest the invention claimed in claims 7-10.

Because none of the references of record discloses the details of the claimed invention lacking in the primary reference, nor the unique advantages thereof, there can be no suggestion to modify the structure to contain those features. See In re Civitello, 339 F.2d 243, 144 USPQ 10, (CCPA 1964).

Claims 13-20 were rejected under 35 USC 103(a) as unpatentable over Jegousse et al, in view of Shirai et al (JP' 865) and Shirai (JP '065). Applicant respectfully traverses this rejection.

Both Shirai references cited by the Examiner disclose a welding machine and a method of welding a fuel injector. However, each of the Shirai references fails to teach or suggest a plurality of energy applying guns and a welding path traced a plurality of times by applied energy spots. Jegousse merely discloses a plurality of energy applying guns surrounding an object to be welded. Jegousse fails to teach or suggest, however, a welding path traced a plurality of times as recited in the noted claims. It is therefore

respectfully submitted that the invention recited in claims 13-20 is not properly rejected as anticipated by or obvious from the applied art.

Claim 21 was rejected under 35 USC 103(a) in view of Schultz, Minamida and Spooner. Applicant respectfully traverses this rejection.

Schultz discloses a welding machine and a method of welding employing a relative rotation between a laser gun and a welding object. Schultz fails to teach or suggest, however, a plurality of laser guns simultaneously activated while relatively rotating the welding object.

Minamida discloses a welding machine and a method of welding using two opposing laser guns. However, Minamida's machine and method merely rotates the welding object by 180 degrees and does not rotate the welding object more than one revolution.

Therefore, even if a person ordinarily skilled in the art were to combine Schultz and Minamida, it is impossible to reach the claimed invention of amended Claim 21 since amended claim 21 specifies that the energy applying units apply welding energy while rotating through more than one revolution.

Spooner discloses a machine and method for welding an end of a thin metal tube. Spooner discloses three laser heads that are triangularly arranged. However, Spooner fails to disclose a rotating action and a welding path traced a plurality of times.

Therefore, even if the teachings of Spooner are combined with Schultz, Minamida, or both, the claimed invention would still not be taught or suggested.

For all the reasons advanced above, reconsideration and withdrawal of the Examiner's prior art rejections are solicited.

SHIRAI et al
Appl. No. 10/081,239
October 21, 2004

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance and an early Notice to that effect is earnestly solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 
Michelle N. Lester
Reg. No. 32,331

MNL:slj
1100 North Glebe Road, 8th Floor
Arlington, VA 22201-4714
Telephone: (703) 816-4000
Facsimile: (703) 816-4100